e-Procurement for the Public Sector: Determinants of attitude towards Adoption

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ABSTRACT

This paper presents a case study on Malaysia's e-Procurement initiative. It was launched as one of the projects under the e-Government Flagship. A survey was conducted to identify the attitude towards adoption and use of e-Procurement system among the suppliers in who is transacting goods and services with the government of Malaysia. A total of 502 questionnaires were collected and the data were analyzed to look at the level of acceptance among the suppliers who are the partners of e-Perolehan system. Technology Acceptance Model (TAM) was used and the two main variables i.e. perceived usefulness and perceived ease of use were computed both in terms of the mean score and demographic profile of the participating organizations. The general findings indicate a positive attitude among the suppliers in adopting and using the e-Perolehan system. However, there are some issues and challenges that need to be addressed before the government can realize the vision and objectives of e-Perolehan system implementation.

Key words: e-Procurement, Technology Acceptance Model, perceived usefulness, perceived ease of use.

1. Introduction

The advent of Internet Technology (IT) and Information and Communication Technology (ICT) has made it possible the governments to transform themselves by offering various services online The use of ICTs has also dramatically changed government services, business models and people's expectations of the quality and efficiency of information sharing and service delivery (Brown, 2005; Maniam, 2005). This transformation of governments into Electronic Government (e-Government) turns out to be a global phenomenon (Layne & Lee, 2001; Zouridis & Thaens, 2004; Anderson & Henriksen, 2006). Many countries have formulated various policies, visions, objectives, plans and strategies for introducing some form of e-Government to benefit their citizens.

E-Government was introduced in Malaysia as one of the eight flagships within the Multimedia Super Corridor (MSC) Malaysia initiative in the year 1996. Apart from catalyzing the reinvention of the government apparatus, the vision is also to pioneer e-Government as a benchmark to become a global government by employing high-end, state of the art information and communications technologies to facilitate efficient and effective delivery of government services through new electronic delivery channels. The dual objectives of e-Government are to reinvent the government of Malaysia in terms of service

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delivery through the use of ICT and to catalyze the successful development of the MSC with ICT as one of the leading sectors of the economy .To date, there are eight projects launched under the e-Government Flagship since its inception in 1997. All these projects will use ICT and multimedia technologies to transform the way the government operates, for coordination and for enforcement. Table 1 summarizes the projects and the purpose of each project.

Table 1: Main Projects under the E-Government Flagship

Projects	Purpose
Generic Office Environment (GOE)	Provides a new paradigm of working in a collaborative environment where government agencies communicate, interact and share information.
Electronic Procurement (EP)	Links the government and suppliers in an online environment. Government agencies as buyers procure goods/services by browsing catalogues advertised by suppliers. A one-stop Portal for public sector procurement in Malaysia.
Project Monitoring System (PMS)	Provides a new mechanism for monitoring implementation of development projects, incorporating operational and managerial functions, and knowledge repository, in support of various ICT projects.
Human Resource Management Information System (HRMIS)	Provides a single interface for government employees to perform HRD functions effectively and efficiently in an integrated environment.
Electronic Services (e-Services)	Enables direct, online transactions between the public, the government and large service providers via electronic means – examples include, e-tax, e-summons.
Electronic Labour Exchange (ELX)	A one-stop-centre for labor market information, accessible to government agencies, the business sector and the citizens.
E-Syariah	Introduces administrative reforms that upgrade the quality of services in Syariah courts. To enhance the Islamic Affairs Department's effectiveness- better monitoring and coordination of its agencies and 102 Syariah courts.
E-Land / E-Tanah	To achieve an updated, effective, efficient and accurate National Land Administration System via utilization of Information Communication and Technology (ICT),

Source: MDeC (www.mdc.com.my) (2007)

A major component of e-Government projects in Malaysia pertains to the establishment of an electronic procurement system. This project is known as e-Perolehan in Malaysia and the term is being used as an official term by the Ministry of Finance Malaysia. E-Perolehan is an end-to-end electronic procurement system that enables Government Agencies around the country to procure products and services electronically from both local and international suppliers. The long term aim of the e-Perolehan initiative in Malaysia is to use Internet technologies to bring government agencies in the country and suppliers around the world together into a virtual trading environment (Zaharah, 2007). E-Perolehan is a multi-buyer, multi-supplier electronic procurement domain, which allows government agencies to function as independent buying entities under a single buying organization (www.eperolehan.com.my, 2007; Zaharah, 2007). It provides a standard procurement method for both goods and services following the government's procurement policies and procedures. The e-Perolehan project is lead by the Ministry of Finance and supported by Commerce DotCom Sdn. Bhd. (CDCSB) as the IT solution provider. E-Perolehan is an on-line government procurement process for services and supplies, linking more than 120,000 suppliers to

government agencies and departments. The total estimated cost for purchasing these supplies and services is about RM 35 billion (Table 2) annually (Muhammad & Nazariah, 2003).

Table 2: Government's Budget on Procurement

Year	Total Government Budget (RM million)	Percentage for Procurement of services & Supplies (%)	Total Allocation (RM million)
2007	159 496	14.5	23 151
2006	136 748	15.0	20 553
2005	117 444	16.0	18 790
2004	112 490	15.3	17 215
2003	109 801	13.0	14 253
2002	100 518	12.0	12 065
2001	91 046	11.1	10 078
2000	78 025	9.7	7 564
1999	65 095	9.5	6 188
1998	64 124	10.1	6 473
1997	59 982	9.8	5 890

Source: www.mof.gov.my, 2007

Given the significant spending on procurement of goods and services it is timely for the government to implement the e-Perolehan system in order to achieve efficiency and effectiveness besides transparency in the procurement process (Maniam & halimah, 2008, 2007; Maniam et. al, 2007). However, the total transaction recorded thru e-Perolehan since 2000 to June 2008 was RM 9.7 billion (Nor'aini, 2008). The balance was transacted using the manual or traditional procurement processes. The main reason for this is that not many suppliers are e-Perolehan enabled. Thus far, studies have not been done (either by the Ministry of Finance or academicians) to understand the reasons for the low uptake of the e-Perolehan in Malaysia among government registered suppliers. Therefore, this study intend o examine the attitude among the suppliers as a determinant factor to adopt and eventually use the e-Perolehan system.

Vision of e-Perolehan is:

- Improve and ensure an effective and efficient electronic procurement management system.

Mission of e-Perolehan is:

- To make ePerolehan as a main procurement mechanism to be used by the Government agencies and suppliers.

E-Perolehan objectives are:

- To ensure accountability and transparency in all Government procurements.
- To ensure best value for money for Government procurement.
- To ensure suppliers receive faster and more accurate payment.
- To increase collaboration between the business sector and the Government.

2. Technology Acceptance Model

The Technology Acceptance Model (TAM) introduced by Davis (1989) is an adaptation of the Theory of Reasoned Action (TRA) specifically tailored for modelling user acceptance of IS. TAM was developed to explain and predict computer usage behavior. Although several theoretical models have been proposed to describe the phenomenon of IT acceptance, TAM is increasingly recognized as a robust yet parsimonious conceptualization (Agarwal & Karahannna, 1998). The goal of TAM is "to provide an explanation of the

determinants of computer acceptance that is general, capable of explaining user behavior across a broad range of end-user computing technologies and user populations, while at the same time being both parsimonious and theoretically justified" (Davis et al.. 1989; p 985). It states that beliefs influence attitudes; which lead to intentions and to behaviors (Figure 1). TAM proposes two specific belief constructs, that is, perceived usefulness (the extent to which a technological innovation is expected to improve the potential adopter's performance) and perceived ease of use (the degree to which the potential adopter expects a technological innovation to be free of effort in use) as critical antecedents to an individual's technology adoption process (Davis, 1989; Davis et al., 1989). Both perceived usefulness and perceived ease of use are specific perceptions and are anchored to specific beliefs users hold about the system. In sum, it was found that TAM could successfully predict IS acceptance behavior under different technologies and different situations. In addition, it was found that TAM was a much simpler; easier to use and more powerful model of the determinant of user acceptance of computer technology than other models (Igbaria et al., 1997).

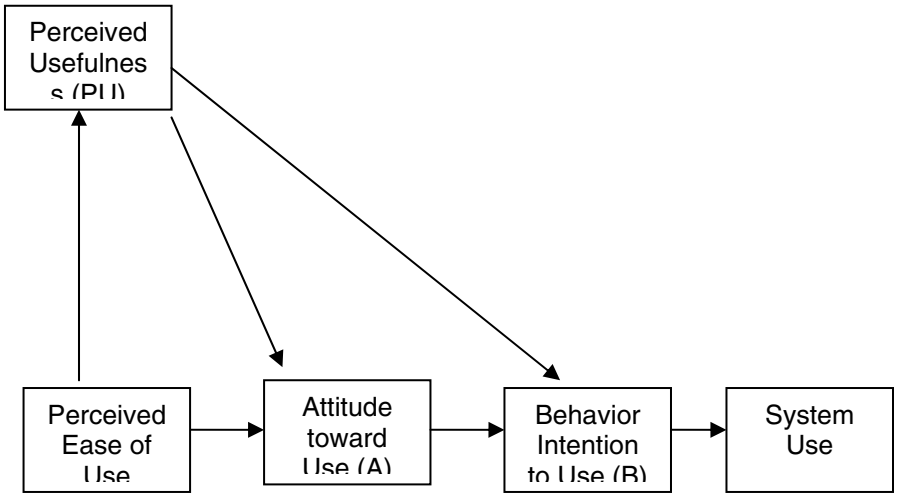

Figure 1: Technology Acceptance Model (TAM) by Davis (1989)

TAM has been used in the field of Information Systems (IS) since its development. TAM was used first in e-Commerce related fields. However due to the similarities between e-Commerce and e-Government, especially when previous research has found that the factors from technology acceptance, diffusion of innovation and trust-worthiness models play a role in user acceptance of e-Commerce (Gefen et al. 2003; Pavlou, 2003), it is expected that they will also affect citizen adoption of e-Government (Warkentin et al, 2002; Carter & Belanger, 2005).

2.1 Organizational Perceived Usefulness

Perceived usefulness (PU) is defined as "the degree to which a person believes that using a particular system would enhance his job performance" (Davis, 1989; p. 320). This perception can vary between users and types of e-Government systems studied. Perceived usefulness has a direct positive correlation with attitude towards using the system and behavior intention to use the system, which in turn will enhance the e-Procurement system use. A study by Malone and Yates (1989) reveals that IT adoption in an organization is influenced by the organization's perceived usefulness of the system besides user satisfaction and system usage. There are also other studies related to organizational perceived usefulness and IT adoption (Schepers et al., 2005; Sun & Zhang, 2006; Nguyen & Barrett, 2006). In the case of adoption of Automated Teller Machine (ATM) by banks worldwide (Saloner & Shepard, 1995) and the adoption of electronic switching technology in the USA (Majumdar and Venkataraman, 1998) are clear indications that perceived usefulness

plays an important role in the adoption and use of IT in an organization either within the organization or worldwide.

2.2 Organizational Perceived Ease of Use

Perceived ease of use (PEOU) is defined as "the degree to which a person believes that using a particular system would be free of effort" (Davis, 1989, p. 320).On the e-Procurement analysis, the users perceived ease of use level can be studied by conducting a study on the end users to know whether they perceive that using the system is free of effort. This in turn will derive the attitude and behavior intention of a person towards using the system. However many researchers have studied the perceived usefulness more in terms of the individual rather than the organizational perspective. Some of the studies on perceived usefulness and IT adoption are in various industries like universities, food industry, health industry, internet banking, electronic commerce, education sector and public library. (Carter & Belanger, 2005; Sun & Zhang, 2006; Nguyen & Barrett, 2006).

3. Data Collection

A total of 3,000 questionnaires were sent in October 2006 by mail to randomly selected suppliers. The findings reported here are based on the analysis of 502 completed questionnaires. Table 3 depicts the characteristics of sample surveyed in this study. Most of the firms are Private Limited (90 percent) and fall within the Small Medium Industries (SMI) definitions. In terms of number of employees, most of the firms employed less than 20 workers (75 percent). About 50 percent of the firms have registered as e-Perolehan enabled after the year 2004 compared to about 40 percent of them registered before 2004. About 73 percent of the firms' annual sales using e-Perolehan system are within RM 1 million per year; however, only about 25 percent have recorded annual sales in the range of RM 1 million to RM 5 million per year. Eighty nine percent of the respondents doing business with both the government and the private sector, and about 11 percent of them solely depend on government business. A total of 266 suppliers (53 percent) out of 502 firms have used at least one of the e-Perolehan modules, that is, central contract, direct purchase, tender and quotation, whereas 236 suppliers have not used the e-Perolehan system. However, about 91 percent of the latter has indicated that they will adopt e-Perolehan in the near future.

Table 3: Organization's Profile

Type of Organization

Type of Organization	Frequency	Percent
Sendirian Berhad / Private Limited	452	90
Berhad / Limited	9	1.8
Sole Proprietor	41	8.2
TOTAL	502	100

Number of Employees

No. of Employees	Frequency	Percent
Less than 10 workers	259	51.6
11-20 workers	118	23.5
21 – 30 workers	40	8.0
31-40 workers	10	2.0
41-50 workers	23	4.6
more than 50 workers	52	10.4
TOTAL	502	100

Year of e-Perolehan Registration

Year	Frequency	Percent
2000	49	9.8
2001-2003	151	31.1
2004-2006	296	58.9
2007	6	1.2
TOTAL	502	100

Annual Transaction using e-Perolehan

Sales (RM 000')	Frequency	Percent
Less than RM 250	162	32.3
RM 250 – RM 500	93	18.5
RM 500 – RM 750	62	12.4
RM 750- RM 1 million	59	11.8
RM 1 – RM 5 million	94	18.7
More than RM 5 million	32	6.4
TOTAL	502	100

Market Focus

Market Focus	Frequency	Percent
Only Government	55	11.0
Both Government & Private	447	89.0
TOTAL	502	100

E-Perolehan Users

Number of users / non-users	Frequency	Percent
Yes	266	53.0
No	236	47.0
TOTAL	502	100

4. Research Findings

The respondents are organizations which are registered with the Ministry of Finance to enable them to sell goods and services to government departments and agencies. The respondents were asked to indicate their perceptions on a three-scale points (1- Strongly Disagree, 2- agree and 3- Strongly Agree). On perceived usefulness, respondents generally agreed that organizational perceived usefulness plays an important role in the adoption of the e-Perolehan. In other words, they supported the idea that by adopting e-Perolehan, they can derive a lot of benefits. This is evident by the descriptive profile of organizational perceived ease of use in Table 4. All the items show that the mean score is above two with the highest mean score for e-Perolehan is useful (mean= 2.59) and the lowest mean score for e-Perolehan improves selling efficiency (mean = 2.25).

Table 4: Influence of Organizational perceived usefulness on e-Perolehan

Organizational perceived usefulness	**Mean**	**S.E. Mean**	**Std. Deviation**
e-P is useful	2.59	0.03	0.638
e-P supports selling requirements	2.41	0.03	0.723
e-P improves selling efficiency	2.25	0.03	0.730
e-P simplifies selling process	2.33	0.03	0.708
e-P reduces financial costs	2.26	0.03	0.766
e-p increases administrative savings	2.33	0.03	0.747
e-P increases overall job performance	2.31	0.03	0.717
e-P increases overall job productivity	2.29	0.03	0.723
e-P is effective than manual system	2.41	0.03	0.728
e-P improves information management	2.45	0.03	0.669
e-P is fast	2.46	0.03	0.708
e-P improves inventory management	2.36	0.03	0.689
Average mean score	**2.372**	**0.026**	**0.572**

On perceived ease of use, respondents generally viewed that e-Perolehan is easy to use, easy to learn and user friendly. The highest mean score was recorded for e-Perolehan is easy to learn (mean = 2.57) and the lowest mean score is for e-Perolehan is user friendly and flexible to interact with (mean = 2.42 / Table 5).

Table 5: Influence of Organizational perceived ease of use on e-Perolehan

Organizational perceived ease of use	**Mean**	**S.E. Mean**	**Std. Deviation**
e-P is easy to use	2.53	0.03	0.661
e-P is flexible to interact with	2.41	0.03	0.714
e-P is easy to learn	2.57	0.03	0.627
e-P is user friendly	2.42	0.03	0.699
e-P can be easily understood	2.50	0.03	0.668
e-P skills can be acquired easily	2.47	0.03	0.658
Average mean score	**2.484**	**0.025**	**0.556**

Perceived usefulness and the background factors are shown in Table 6. As can be observed, six out of the eight variables show no significance differences in terms of perceived usefulness. Significant differences in the mean score is observed between position of the respondents (p-value = 0.027) where executives and officers scored the highest mean (mean = 29.56) compared to senior managers and managers (mean = 28.48) and lowest mean score recorded is for board of directors (mean = 27.45). Another variable with significant difference is for the year of the e-Perolehan registration (p-value = 0.013) where again as observed earlier (Table 6), those firms registered before 2000 had a higher mean score (30.51) compared to firms registered after 2000.

Table 6: Perceived Usefulness by Background factors

Background factors	**Details**	**N**	**%**	**Mean**	**Std. Error**	**p-value**
Number of Employees	Total	502				0.388
	Less than 10 workers		51.6	28.07	0.42	
	11-30 workers		31.5	28.99	0.53	
	More than 30 workers		16.9	28.72	0.81	
Paid-up Capital	Total	502				

	Less than RM 100,000		47.8	28.90	0.41	0.430
	RM 101,000-RM 500,000		19.5	27.81	0.74	
	RM 501,000-RM 1 million		18.3	27.84	0.78	
	More than RM 1 million		14.3	28.78	0.83	
Annual Sales	Total	502				0.134
	Less than RM 250,000		32.3	28.64	0.49	
	RM 251,000-RM1 million		42.6	28.95	0.47	
	More than RM 1 million		25.1	27.44	0.67	
Market Focus	Total	502				0.100
	Only government sector		11.0	29.35	1.03	
	Government and Private		89.0	28.36	0.32	
Geographic Concentration	Total	502				0.154
	Domestic market		71.9	28.20	0.37	
	Domestic and overseas		28.1	29.17	0.52	
Position	Total	502				0.027
	Board of directors		31.7	27.45	0.54	
	Senior manager/manager		38.8	28.48	0.51	
	Executive/officer		29.5	29.56	0.53	
Number of Products	Total	502				0.885
	Only 1 product		32.9	28.27	0.54	
	2-5 products		44.0	28.62	0.46	
	More than 5 products		23.1	28.49	0.65	
Year of the e-Perolehan Registration	Total	502				0.013
	Before 2000		9.8	30.51	0.98	
	2001-2003		30.1	27.35	0.57	
	2004-2007		60.2	28.70	0.39	

A significant difference is obtained for the number of employees (p-value = 0.027) where firms with more than thirty employees scored a higher mean value (mean = 15.55) compared to firms with less employees (Table 7). Another variable which is significant is the year of the e-Perolehan registration (p-value = 0.006) where those firms registered before 2000 scored the highest mean (mean = 15.84) compared to others which registered after 2000.

Table 7: Perceived Ease of Use by Background factors

Background factors	**Details**	**N**	**%**	**Mean**	**Std. Error**	**p-value**
Number of Employees	Total	502				0.027
	Less than 10 workers		51.6	14.54	0.21	
	11-30 workers		31.5	15.15	0.27	
	More than 30 workers		16.9	15.55	0.31	
Paid-up Capital	Total	502				0.561
	Less than RM 100,000		47.8	14.77	0.21	
	RM 101,000-RM 500,000		19.5	14.71	0.37	
	RM 501,000-RM 1 million		18.3	15.23	0.35	
	More than RM 1 million		14.3	15.18	0.38	
Annual Sales	Total	502				0.176
	Less than RM 250,000		32.3	14.59	0.27	
	RM 251,000-RM1 million		42.6	15.21	0.21	

	More than RM 1 million		25.1	14.77	0.32	
Market Focus	Total	502				
	Only government sector		11.0	15.60	0.41	0.100
	Government and Private		89.0	14.82	0.16	
Geographic Concentration	Total	502				
	Domestic market		71.9	14.91	0.18	0.923
	Domestic and overseas		28.1	14.88	0.26	
Position	Total	502				
	Board of directors		31.7	14.47	0.28	0.119
	Senior manager/manager		38.8	15.00	0.24	
	Executive/officer		29.5	15.22	0.25	
Number of Products	Total	502				
	Only 1 product		32.9	14.73	0.26	
	2-5 products		44.0	15.04	0.23	0.678
	More than 5 products		23.1	14.89	.031	
Year of the e-Perolehan Registration	Total	502				
	Before 2000		9.8	15.84	0.45	
	2001-2003		30.1	14.26	0.31	0.006
	2004-2007		60.2	15.01	0.18	

5. Issues & Challenges

Overall the implementation of e-Perolehan system in Malaysia is progressing well with a positive mindset among the suppliers. However, there are some key issues and challenges inherent within Malaysia's e-Perolehan initiative that prevents the government and the service provider from maximizing the value potential of the system:

Issues & Challenges from Government

- Application hiccups – some of the applications are not well understood and therefore not fully utilized yet.
- Limited commitment and ownership to support and push e-Perolehan implementation at ministries/agencies.
- Ministry's local area network (LAN) and firewall posed additional unexpected dependencies to the rollout team.
- Ministry/agency IT dept was not involved directly from the beginning of the implementation.
- Successful interfacing to e-SPKB for budget check is reliant on external factors- EG*net, availability of IB gateway and LFEP servers, etc.
- Intermittent EG*net connectivity issues.

Issues & Challenges from Supplier

- Suppliers are adopting a 'wait-and-see' attitude on e-Perolehan enablement- most of them do not want to register themselves to be e-Perolehan enable suppliers due to the cost factor and would like to do business using the manual procurement system as long as possible.
- Low IT literacy amongst the suppliers- most of them is transacting using either direct purchase or central contract modules and they are not highly educated and IT savvy.
- Perceived high cost of enablement (pc, smart card, smart card reader, digital certificate) – on average s supplier need to pay about RM 1500 (USD 300) to be e-Perolehan enable.
- Suppliers contact information not up to date- the data base with Ministry of Finance is not up to date thus creates a lot of confusions in determining the current of the suppliers.

- Ignorance over the importance of electronic catalogue- most of them still prefer to use the manual printed catalogue rather the online version.
- Lack of confidence over information's security and confidentiality- lack of trust and confidence among the suppliers especially in providing credit card numbers and password to access to the e-Perolehan system.
- In order to overcome the above mentioned issues and challenges, some of the strategies to increase government procurement using e-Perolehan platform includes:
- Change management programme – awareness (road shows, talk, seminars and promotion), TV & radio interviews (TV as, exhibition, bulletin and newspaper articles) and training (through INTAN and ministries' programme to suppliers by CDCSB).
- Enforcement – treasury instructions/circulars and e-Perolehan task force.
- Monitoring- auditing, benefit capture study, reporting mechanism, ministries' e-Perolehan implementation committee.
- Support service- help desk, e-Perolehan centers and ministries' e-Perolehan coordinator.
- Continuous infrastructure & application enhancement- system application, technology improvement, infrastructure and system integration.
- SMART target procurement- smart goals (specific, measurable, achievable, realistic and time bound), enablement for responsibility centers and suppliers, increasing targets for e-Perolehan transactions (RM 5 bil for 2008, RM 8 bil for 2009 and RM 10 bil for 2010).

6. Concluding Remarks

The success of e-Perolehan depends both on government agencies and suppliers commitment in using e-Perolehan, application system that is user friendly, stable network connectivity and smooth integration with other entities. On balance, the general consensus amongst both the buyer and seller communities is that e-procurement will become an important management tool to enhance the performance of supply chain especially in the public sector. In this regard, we expect that between the next three to five years, more suppliers will grab the opportunity and benefit fully from the e-Perolehan initiative in Malaysia.

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